REMARKS

By this Amendment, claims 1, 5, 18 and 23 have been amended. No new matter has been added. Also, claims 3 and 4 have been canceled without prejudice or disclaimer. Accordingly, claims 1, 2, and 5-23 are now pending in the present application.

While gratefully acknowledging the allowability of claims 6-17, Applicant submits that all the pending claims are patentable over the art of record. Applicant also thanks the Examiner for indicating that claims 22 and 23 would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims, but Applicant submits that a broader scope of the invention is patentable.

I. Claim Rejection 35 U.S.C. § 103

Claims 1-5 and 18-21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Moring et al. (US 6,159,368; hereinafter "Moring"). Claim 1 has been amended to incorporate the features of claims 3 and 4. Accordingly, reconsideration is respectfully requested in view of the following comments.

Claim 1 recites:

> A cartridge for nucleic acid separation and purification which comprises: a cylindrical main body formed of a cylindrical part and a bottom part having an opening; and a nucleic acid-adsorptive porous membrane held on the bottom part,
>
> a rim part of the nucleic acid-adsorptive porous membrane being held by a molding material forming the cylindrical part of the cylindrical main body,
>
> wherein the cylindrical part is integrally formed with the bottom part and the nucleic acid-adsorptive porous membrane so as to prevent breakage and poor sealing of the nucleic acid-adsorptive porous membrane, and
>
> the rim part of the nucleic acid-adsorptive porous membrane is compressed so that voids in the rim part of the membrane disappear,
>
> which cartridge is produced by:

inserting a bottom member and the nucleic acid-adsorptive porous membrane into a cavity of an injection molding die wherein the nucleic acid-adsorptive porous membrane is placed in the bottom member providing the bottom part which is one of two parts that sandwich and hold the nucleic acid-adsorptive porous membrane; and

injecting the molding material into the cavity to form the cylindrical part of the cylindrical main body wherein a portion forming the cylindrical part which is the other of the two parts that sandwich and hold the nucleic acid-adsorptive porous membrane is integrated with the bottom member while the nucleic acid-adsorptive porous membrane is sandwiched and held between the cylindrical part and the bottom part, and the rim part of the nucleic acid-adsorptive porous membrane is held and compressed by injection pressure of the molding material forming the cylindrical part of the cylindrical main body.

While Moring discloses "compression of each filter element," as described in column 4, lines 48-50 and column 16, lines 35-36, Moring does not disclose or suggest that "the rim part of the nucleic acid-adsorptive porous membrane is compressed so that voids in the rim part of the membrane disappear," as recited in claim 1. Applicant submits that Moring describes the existence of the dead volume for the filter element at the rim part (see Moring, column 16, lines 57-67, and Figs. 5 and 6), which indicates that the rim part of the filter has voids.

Further, as noted in paragraph [0009] of the present published specification (US 2007/0148649), "in the case of the membrane to which excessive compressing force is applied to remove voids by the prior art, the membrane may be broken." Accordingly, Moring cannot simply be compressed so that voids in the rim part of the membrane disappear because the force would break the membrane.

Applicant submits that the advantageous effect of the feature of claim 1 is described in the present published specification, paragraphs [0019]-[0020], described as "the sample solution or the like is surely prevented from remaining in the rim part and leaking from the side face of the membrane."

In view of the above, Applicant submits that it would have not been obvious to one having ordinary skill in the art to find the rim part of the membrane being compressed so that voids in the rim part of the membrane disappear, based on Moring, and that claim 1 is patentable for at least this reason.

Claim 18 recites:

> A cartridge for nucleic acid separation and purification comprising a cylindrical body with a first opening and a second opening and having a nucleic acid-adsorptive porous membrane held in the cylindrical body, in which separation and purification of nucleic acid are conducted by passing a sample solution containing nucleic acid by pressurized gas from the first opening to the second opening to allow the nucleic acid to be adsorbed to the nucleic acid-adsorptive porous membrane, wherein:
>
> the cylindrical body comprises: a cylindrical main body having a bottom part supporting the nucleic acid-adsorptive porous membrane; and a discharge part connecting the bottom part opening formed in the bottom part and the second opening; and
>
> a thickness of a part forming the second opening of the discharge part is 0.2 mm or more.

The Examiner acknowledges that Moring does not teach "a thickness of a part forming the second opening of the discharge part is 0.2 mm or more." However, the Examiner asserts that "it would have been obvious to one having ordinary skill in the art at the time of the invention to have the thickness of the part forming the second opening of the discharge part be 0.2 mm or more, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involve only routine skill in the art."

Applicant submits that the rejection is unsupported because the Examiner has not explained how the thickness of a part forming the second opening of the discharge part is a results effective variable. "A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation"

(MPEP § 2144.05 (II)(B)). The Examiner has not specified what "recognized result" would be achieved by altering the thickness of Moring's part which forms the second opening of the discharge part.

On the other hand, the present published specification, at paragraphs [0042]-[0044], discloses that by making the thickness of the part forming the second opening of the discharge part to be 0.2 mm or more, a cartridge for nucleic acid separation and purification can be obtained in which bubbles are prevented from moving to or attaching to an outer wall surface of the discharge part, even when the bubbles are swirled up by air.

Again, the Examiner has pointed to nothing in Moring which suggests making "a thickness of a part forming the second opening of the discharge part is 0.2 mm or more." Thus, it is unclear how the Examiner could reasonably conclude that the subject matter of claim 18 relates to art-recognized result-effective variables.

Accordingly, Applicant submits that Moring does not teach or suggest "a thickness of a part forming the second opening of the discharge part is 0.2 mm or more," as recited in claim 18, and that claim 18 is patentable for at least this reason.

Applicant submits that claims the remaining claims are patentable at least by virtue of their respective dependencies on claims 1 and 18.

II. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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